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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/988,565	11/20/2001	John H. Keller	V0077/7215WRM	8886

7590

05/01/2003

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EXAMINER

VO, TUYET THI

ART UNIT	PAPER NUMBER
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2821

DATE MAILED: 05/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/988,565

Applicant(s)

KELLER, JOHN H.

Examiner

Tuyet Vo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 09 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 17-21 and 23 is/are allowed.
- 6) ☒ Claim(s) 1,2,4-6-11,15,16,22 and 24-26 is/are rejected.
- 7) ☒ Claim(s) 3,12-14,27 and 28 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 November 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5 and 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Specification*

The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### *Drawings*

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the deceleration electrode being segmented must be shown or the feature(s) canceled from the claim 27. No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C.

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122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. Claims 1, 6 and 8-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Anderson et al. (US Pat. 5,365,070), hereinafter Anderson.

Anderson discloses an ion optical apparatus as well as method (Fig. 3) for producing a low energy ion beam, the ion beam (21) having a beam plasma (22) at a final ion beam energy, the apparatus comprising:

an acceleration electrode (17) for accelerating the ion beam;

a deceleration electrode (18) downstream of the acceleration electrode for decelerating the ion beam, the deceleration electrode having a voltage (35KV) that is selected to provide a potential barrier to thermal ions in the beam plasma (22) to inhibit thermal ions (which are generated by a very high energy source) from reaching the acceleration electrode, wherein the aperture of the deceleration electrode is larger than the aperture of the acceleration electrode (Fig. 3); and

an ion optical element (19) is downstream of the deceleration electrode for inhibiting electrons in the beam plasma (22) from reaching the deceleration electrode (18).

4. Claims 16, 22 and 24-26 are rejected under 35 U.S.C. 102(e) as being anticipated by Politiek et al. (US Pat. 6,326,631), hereinafter Politiek.

Politiek discloses an extraction apparatus employing a method of increasing or varying the focal properties of a deceleration lens (Fig. 1) comprising an acceleration electrode (8), deceleration electrodes (4, 6), wherein the deceleration electrodes being segmented and having different voltages applied therein; and a beam plasma formed at a final ion beam energy (2), the method comprising a step of varying the potential on the deceleration electrode (col. 4, lines 16-65) transversely relative to the beam line (Fig. 2) to effect an increase or variance in the focal properties of the deceleration lens.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson as applied to claims 1 and 10 above, and further in view of the admitted prior art cited by the applicant.

Anderson discloses substantially the claim invention as noted above except for the deceleration electrode having a voltage selected such that the potential of the beam axis near the deceleration electrode is at least slightly positive with respect to the potential of the beam plasma.

The prior art provides an extraction system (Fig. 1A and 1B) comprising a deceleration electrode (13) having a voltage selected such that the potential of the beam axis (18) near the deceleration electrode is at least slightly positive with respect to the potential of the beam plasma (21).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize low energy plasma beam at final electrode as taught by the cited prior art into the Anderson optical device in order to achieve a desired focusing of ion beam onto a substrate or a wafer.

7. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson as applied to claim 1 above, and further in view of Hashimoto Kiyoshi (JP Pub. 1-209645), hereinafter Hashimoto.

Anderson discloses substantially the claim invention as noted above except for the ion optical element comprising a magnetic element that is limited on axis electric field by the deceleration.

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Hashimoto discloses ion source apparatus (Figs. 1-8) comprising acceleration electrodes (3), deceleration electrode (4) and magnets (7, 8) in that the electric field being limited on the axis by the deceleration electrode (Figs. 6-8).

It would have been obvious to one ordinary skill in the art at the time the invention was made to utilize the magnet as taught by Hashimoto into the Anderson optical device in order to achieve a ability to vary the ion beam onto a substrate or a wafer at desired manner.

8. Claims 7 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson as applied to claims 1 and 10 above, and further in view of Politiek.

Anderson discloses substantially the claim invention as noted above except for segmenting at least one of the acceleration electrode and the deceleration electrode.

Politiek discloses optical apparatus (Fig. 1) as well as method for producing a low energy ion beam comprising an acceleration electrode (col. 4, lines 21-29) and deceleration electrodes (4, 6), wherein the deceleration electrodes are segmented in the direction lateral to the ion beam to define individually controllable electrode segments (col. 4, lines 14-65).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize variation of segment potential of deceleration electrodes as taught by Politiek into the Anderson optical device in order to increase controllability of the direction of ions in the ion beam focusing onto a substrate or a wafer in a desired manner.

#### ***Allowable Subject Matter***

9. Claims 17-21 and 23 are allowed.

10. Claims 3, 12-14, 27 and 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter: the prior art fails to establish an ion extraction system or a deceleration lens system producing low energy beams to optimum the virtual image while reducing divergence of ion beams. The system is implemented by comprising a potential difference between an acceleration electrode

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and a deceleration electrode, a positive potential required between the deceleration electrode and a final beam energy to prevent ion beams from diversion to the acceleration, wherein the final beam comprising thermal positive ions and electrons as required in claims 17; or in claim 27 requiring both the acceleration electrode and the deceleration electrode being segmented. The prior art further lacks to disclose the potential of repulsing electrode selected slightly negative with respect to the potential of the beam plasma as required in claims 3, 12, 23 and 28.

### *Citation of pertinent prior art*

12. The prior art made of record and not relied upon is considered pertinent to applicants' disclosure.

Bernius et al. (US Pat. 4,933,551) discloses reversal electron attachment ionizer for detection of trace species.

### *Conclusions*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuyet Vo whose telephone number is 703 306 5497. The examiner can normally be reached on Mon-Fri.

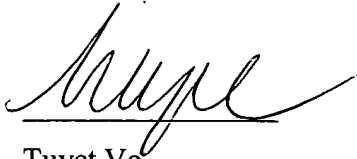
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong can be reached on 703 308 4856. The fax phone numbers for the organization where this application or proceeding is assigned are 703 308 7722 for regular communications and 703 308 7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0956.

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A handwritten signature in cursive script, appearing to read 'Tuyet Vo', written over a horizontal line.

Tuyet Vo

April 28, 2003